Gulf of Mexico Alliance
Nutrients and Water Quality Priority Issue Teams

Regional Coordination Efforts

Excessive nutrient inputs are adversely affecting Gulf ecosystems, recreational and commercial industries, and quality of life. To address the issue of excessive nutrient inputs, Gulf States are required by the Clean Water Act to establish criteria for nutrients in coastal ecosystems that will guide regulatory, water quality protection, and land use decisions. Because the five Gulf States face similar problems with excessive nutrient inputs, the Gulf of Mexico Alliance (GOMA) is an important opportunity to build and test management tools to balance nutrients in Gulf waters and achieve healthy and resilient coastal ecosystems. GOMA addresses nutrient issues through both the Nutrient Reduction and Water Quality priority issue teams.

Nutrient Criteria Development

Gulf States are working to establish nutrient criteria for coastal waters and estuaries to prevent nutrient over-enrichment, protect designated uses, and achieve water quality goals. However, coastal ecosystems present a special challenge for the establishment of nutrient criteria due to the high level of variability among systems regionally and their unique ecosystem responses and susceptibility to nutrient enrichment. This level of variability has prevented the establishment of widely applicable nutrient level standards that can be used as management tools to prevent impairments. Therefore the development nutrient criteria for coastal and estuarine waters will require improved understanding of these ecosystems in the Gulf and the establishment of criteria on a waterbody or sub-regional basis.

The U.S. Environmental Protection Agency (EPA) National Nutrient Criteria Program provides guidance and works with the Gulf States to establish numeric criteria for nutrients in coastal waters and estuaries. In their guidance, EPA identified the following process for establishing criteria:

1. Investigation of historical information to reveal the nutrient quality in the past and to deduce the ambient, natural nutrient levels associated with a period of lesser cultural eutrophication;
2. Determination of present-day or historical reference conditions for the waterbody segment based on the least affected sites remaining, such as areas of minimally developed shoreline, of least intrusive use, fed by those tributaries of least developed watersheds;
3. Use of loading and hydrologic models to best understand the density and flow gradients, including tides, affecting the nutrient concentrations;
4. The best interpretation of this information by the regional specialists and Regional Technical Assistance Group (RTAG) responsible for developing the criteria; and
5. Consideration of the consequences of any proposed criteria on the coastal marine waters that ultimately receive these nutrients to ensure that the developed criteria provide for the attainment and maintenance of these coastal uses.

The GOMA Nutrients and Water Quality teams are working together to address the information gaps and resources needed to accomplish this process.

GOMA Progress

The Nutrients Reduction priority issue team held a Nutrients Criteria Conference in January 2007 to further regional collaboration on the development of nutrient criteria. Each state presented their goals, approach, and timeline for the development of nutrient criteria.

State Approaches to Nutrient Criteria Development: [ask each state to edit/add to this section]

Alabama
Goal: To develop science-based defensible nutrient criteria which are protective of designated uses of surface water.

Florida
Goal: Prioritization of waters and schedule for development and adoption consistent with EPA guidance, FDEP anticipates prioritization of specific waters baseed upon the need to address nutrient impairment. Florida's schedule follows the availability of EPA guidance documents (Lakes and Streams are 1st priority; Esturaries are 2nd; Wetlands are 3rd)

Louisiana
Goal: Combination of EPA's approach as outline in guidance and other scientifically defensible methods (i.e., cause and effect-based studies or relationships specific to LA). Relation to uses: LDEQ's designated uses area: fish and wildlife propagation, 1st and 2nd degree contact recreation, drinking water resources, agriculture use, oyster propogation and ONRWs.

Mississippi
Goal: Implement a "Basin Management Approach" designed to protect and restore the quality of Mississippi's water resources. Mississippi strives to make river and stream criteria compatible with estuarine criteria. This is an effort to coordinate effects based criteria with nutrient concentration criteria established by TMDL's.

Texas
Goal: Texas Commissionon Environmental Quality (TCEQ) staff, in conjunction with an advisory group, is working to develop nutrient criteria options for EPA to consider as potential new water quality standards.

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Monitoring

Monitoring has emerged as a key need in the development of nutrient criteria. Monitoring priorities are related to the need to establish current water quality and habitat conditions, expected variability in nutrients and water quality parameters, identify reference sites, and classify systems based on a select set of physical parameters. During the January 2007 Nutrients Criteria Conference, each Gulf state also presented their approach to nutrient monitoring programs. The following table compiles the information presented.

[replace w/updated version]

Monitoring Parameter	#	TX	FL	LA	MS	AL	NCA
Water temp	1		X				
Salinity	2	x	X				
Depth	3	x	X		x		
Water Level	2	x	X				
pH, alkalinity	2	x	X				
conductivity	2	x	X				
Chl-a	5		X	x	x	x	x
DO	4	x	X	x			x
Water clarity	3		X		x		x
Secchi Depth	2		X	x			
TSS	2		X	x			
Turbidity (NTU)	3	x	X	x			
TDS	2		X	x			
DIN	3		X		x		x
Ammonia NH3-N	2		X	x			
NO3+NO2	2		X	x			
TN	2		X	x		?	
TKN	2		X	x			
Ortho-P	1		X				
DIP	3		X		x		x
TP	2		X			?	
TOC	2		X	x			
BOD	1		X				
Pathogens, Fecal C.	2		X			x	
ADCP	1					x	
Nekton Populations	2	x		x			
Sediment TOX	2		X				x
Sediment Contam.	2		X				x
Sed TOC	2		X				x
Benthic Index	2		X				x
Fish Tissue Contam	2		X				x

[should we include a section on combining water quality actions with nutrient actions and the Spring meeting in this paper?]

Regional Monitoring Standardization

The next step to provide important monitoring related resources for nutrient criteria development is to identify opportunities for a common monitoring approach that can provide information needed to understand the transport, fate, and effects of nutrients (including dissolved oxygen related to hypoxia). A common monitoring approach will assist the Gulf States in assessing nutrients and associated water quality factors across the coastal systems in the region. The teams will initiate a pilot project to design a common monitoring approach with a workshop on July 11, 2007.

A goal of the pilot will be to optimize regionally compatible monitoring of a core set of parameters necessary to establish nutrient criteria and monitoring for nutrient effects. In addition, the pilot will explore opportunities to improve our understanding of the water quality, circulation, and biological communities in the Gulf, information that will also allow identification of where to best establish long-term monitoring, what that monitoring should be, and how that monitoring should be carried out.

Ultimately, each state would deploy compatible monitoring methods at locations around the Gulf of Mexico that offer a range of conditions and types of coastal waters. This testing under different conditions will provide better understanding and identification of the core monitoring necessary, and what local factors may require modification of the core design. This knowledge will guide similar subsequent monitoring efforts for other areas around the Gulf of Mexico and should provide information useful to the rest of the coastal U.S.

INSERT CHARLES' TABLE OF PARAMETERS AND METHODS? Or maybe just reference if separate document is better

Modeling

Hydrodynamic and water quality modeling are important tools in the development of nutrient criteria for coastal systems. Modeling may be used to evaluate and predict nutrient transport, flux, effects, and ultimately the criteria and management responses. The States also used the January 2007 conference to discuss modeling needs. The first step in evaluating modeling needs was to conduct an inventory of state, federal, and non-governmental hydrodynamic and water quality models available to support criteria development and improve understanding of nutrient dynamics and effects in coastal systems. Each state conducted an inventory of available models and the results will be made available in a database that provides a user-friendly interface for queries. The teams will use the results of the inventory to identify gaps in models needed to support criteria development.

INSERT MODEL INVENTORY INFORMATION IF AVAILABLE

Classification of Gulf of Mexico Coastal Ecosystems for Criteria Development

Central to the development of nutrient criteria is the classification of coastal ecosystems in the Gulf. Classification is important for monitoring design, relating reference conditions, understanding cause and effect variable responses, identifying management strategies, and evaluating management actions.

The Nutrients Reduction team adopted the following definition of estuarine and near shore coastal waters based on *Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters:*

Estuarine waters are semi-enclosed coastal water bodies with significant freshwater inputs.

Near shore coastal waters shall be defined as those lying within 20 nautical miles of shore, with a subset defined as those within the 3-mile limit.

The teams will continue to explore classification schemes through the July 12 workshop "Understanding Nutrient Dynamics and Effects in Gulf of Mexico Coastal Ecosystems." Additional workshops will be developed to address information needs and determine ways to support classification that is informative at the local and regional level.

Next Steps

The Nutrients and Water Quality teams will combine a portion of their activities to select a core set of water quality parameters for possible technique standardization, and to begin making recommendations for classification scheme and monitoring design applications to a pilot project to be implemented Gulf wide.

This pilot project is envisioned as a test bed for evaluation of establishing reference and existing conditions, with recommendations for modification of ongoing monitoring programs in at least three Gulf of Mexico estuaries. The intent of this pilot project would be to test a classification scheme and monitoring design for establishing these characterizations and to begin generating datasets that allow for between estuary comparisons of such an approach. These tools will be proposed with an eye toward their applicability for measuring progress into the future as well.